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REC'D

August 1, 1991

8-2-91

F.B.

Mr. Frank Battaglia
USEPA Region I
Waste Management Bldg.
90 Canal St.
Boston, MA 02114

Dear Mr. Battaglia

As per our discussion 7/31, enclosed is preliminary information received from LABS TO the laboratories being considered for the upcoming analyses at the Cranston Site. BE SELECTED. Each of the labs have reviewed the Radian QAPjP and have submitted comments. AND NEW I have reviewed the information and have summarized some of the major points in this submission.

The purpose of this submission to EPA is to share the information gained so far in our attempt to make a smooth transition from Radian for the Cranston analyses. As per our previous discussions, we want to qualify more than one lab for the project. The information presented below is a start to identify the common and unique characteristics among the labs being considered. Due to the upcoming groundwater sampling, the information is presented in order to expedite our ability to mutually agree upon a lab.

RADIAN WILL
NOT BE DOING
ANY MORE ANALYTICAL
WORK FOR CIBA. NEW
ANALYTICAL
PLAN TO BE
SUBMITTED

Attachment #1 contains a few minor points which are raised for EPA comment.

Attachment #2 contains a preliminary response from Savannah Labs regarding their routine differences from Radian's approach to Appendix IX. The first two pages are my summary of Savannah's response to highlight changes in detection limits and methods.

Attachment #3 contains CompuChem's preliminary response regarding their routine differences from Radian's approach to Appendix IX. As you can see in their submission, they think several compounds have been de-listed from Appendix IX. They do not normally report all the Appendix IX compounds; these are listed by their associated method.

As per our discussion, I recommend a change of methods for future dioxin and furan analyses. Since Method 8280 does not provide data suitable for risk assessment, I propose using the 12/90 Statement of Work for tetra through octa-chlorinated dibenzo-p-dioxins and dibenzofurans. This SOW provides quantitative results for the 2,3,7,8-chlorinated isomers and is suitable for risk assessment. Another advantage of changing to the SOW is to increase data comparability between labs. The SOW is a state of the art method while 8280 is routinely modified by labs to improve the quality of the data. These modifications are highly lab specific. Is this method change acceptable?



*SEE S2A&P
REB 4.
ATTACH 4.* Attachment #4 contains a letter from Enseco-CAL to EPA's Sample Management Office regarding a requested exemption to one of the 12/90 dioxin/furan Statement of Work (SOW) requirements.

*N^o ?
SEE P1/P2
OF ORGANIZ.
ORGANIZ.
CPORT AND
PLAN* There is a possibility that the validation for the dioxin and furan data will be done by an independent arm of one of the labs under consideration. If this would be viewed as a potential conflict of interest, then please comment. The company has validated data from their company's labs in the past without a conflict arising. Since your opinion may affect the selection of the lab for the dioxin analyses, I raise the issue for comment.

I look forward to your response.

Sincerely,

Diana Baldi

Diana Baldi, Administrator
National Services Contracts

Attachments

cc: Diane Leber
Ken Dupuis
Frank Saksa
Mark Houlday, Woodward Clyde
Joanna Hall, Alliance

Attachment #1: COMPARISON OF THE APPENDIX IX GROUND-WATER MONITORING LIST TO THE RADIAN/CRANSTON LIST OF REPORTED RESULTS

The following issues may be minor. They are stated as issues we may wish to modify as we make the transition to a new lab for the project.

1. Sym-trinitrobenzene 99-35-5: Radian stated on page 13 of 21 in Section 9 of the QAPjP that this compound would be analyzed as a Tentatively Identified Compound (TIC) since no standard was available. Unless EPA knows of a source for a standard of this compound, it will continue to be reported as a TIC in future sampling events. *OK*
2. The following compounds were accounted for in different manner in the two lists. They are either equivalent or a technically acceptable substitute:

<u>Appendix IX</u>	<u>Radian</u>	
Chlordane CAS No. 57-47-9	Alpha-chlordane	<i>OK</i>
	Gamma-chlordane	
Xylene (total) CAS No. 1330-20-7	Ortho-xylene	<i>OK</i>
	Meta & para-xlenes	

Region I should comment that they agree that they are technically acceptable substitutes.

3. The di and tri-chlorinated dioxins and furans are not on the Appendix IX list and were not specifically required to be site-specific compounds (as far as I know). Radian's rationale for reporting them is being investigated. *Don't QUANTIFY*

Attachment # 2

page 1 of 17

COMPARISON OF RADIAN QAPjP WITH SAVANNAH LABS' PROPOSAL

TABLE 1. LIST OF DETECTION LIMITS FOR COMPOUNDS HAVING A HIGHER DETECTION LIMIT FROM THE RADIAN QAPjP FOR EITHER GROUNDWATER OR SOIL/SEDIMENT AS PROPOSED BY SAVANNAH LABS. Note that in some cases only the groundwater detection limits is proposed to be higher and Savannah has a lower detection limit than Radian for the soil/sediment matrix for that compound.

<u>COMPOUND</u>	PRACTICAL QUANTITATION LIMITS			
	<u>GROUNDWATER (UG/L)</u>	<u>SAVANNAH</u>	<u>LOW SOIL/SEDIMENT (UG/KG)</u>	<u>SAVANNAH</u>
RADIAN	SAVANNAH	RADIAN	SAVANNAH	
Acrolein	* 75	→ 100	1500	100
Acrylonitrile	* 50	→ 100	1000	100
Acetonitrile	20	500 (100)	400	500
Dichlorodifluoromethane	20	50	400	50
Vinyl acetate	5.0	10	100	10
Dimethylphenethylamine	10	50	330 → 1700 *	
Ethyl methanesulfonate	10	20	330	660
Methapyriline	40	100	1300 → 3300 *	
N-Nitrosodiethylamine	10	20	330	660
N-Nitrosopyrrolidine	10	40	330 → 1300 *	
N-Nitrosopiperidine	10	20	330	660
Phenacetin	10	20	330	660
Cyanide	0.01	0.01	0.5	1.0
Sulfide	1.0	1.0	2.0	2.5
Antimony	7	25	3	2.5
Dissolved Solids (Total)	1,000	5,000		
Suspended Solids (Total)	1,000	5,000		
COD	5,000	20,000		
Phosphorus, as PO ₄	20	100		
Silica	100	500		
Sulfate	1,000	5,000		

TABLE 2. LIST OF CHANGES IN ANALYTICAL METHODS PROPOSED BY SAVANNAH LABS

<u>COMPOUND</u>	<u>METHOD</u>	RADIAN	SAVANNAH	APPENDIX IX RECOMMENDED
1,4-Dioxane		8240	8270	8015 - 150 PQL
Chlorobenzilate		8270	8080	8270
Pentachloroethane		8270	8240	8240
Sulfotep		8140	8141	8270
Phorate		8140	8141	8140
Dimethoate		8140	8141	8270
Disulfoton		8140	8141	8140 / 8270 2 vs 10 PQL
Methyl parathion		8140	8141	8270 / 8140 10 w.s. PQL
Ethyl parathion		8140	8141	8270
Famphur		8140	8141	8270
Thionazin		8140	8141	8270
o,o,o-Triethylphosphorothioate		8140	8141	8270
Antimony		7041	6010	6010 / 7040 / 7041 300 vs Jan PQL
Nitrate/Nitrite		353.1	353.2	
Phosphorus, as PO ₄		365.2	365.4	
Silica		425C	6010	
Sulfate		375.4	375.2	

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

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JUL 30 1991

July 29, 1991

Ms. Diana Baldi
CIBA-GEIGY Corporation
P.O. Box 18300
Greensboro, NC 27419

Dear Diana,

Enclosed are excerpts from Radian's site specific QAPP which depicts differences in routine methods and detection limits between Savannah Laboratories and Radian.

Savannah Laboratories has conducted method detection limit studies and calculated our own practical quantitation limits which will vary from the PQLs reported by Radian. It may be possible to report lower PQLs if required. We will be happy to discuss any PQLs and methods that may vary from the Radian QAPP.

Please call if you have any questions.

Sincerely,

Linda A. Wolfe
Linda A. Wolfe
Project Manager

enclosure

TABLE 9-1. Appendix IX Volatile Organic Compounds

	Practical Quantitation Limits ^A			
	Groundwater ug/L	Low Soil/Sediment ug/kg	Prep ^C Method	Analytical ^C Method
Acrolein	75-100	1000 100	8240	8240
Acetone	100	2000 100	8240	8240
Acrylonitrile	50-100	1000 100	8240	8240
Acetonitrile	20-500	400 500	8240	8240
Bromomethane	10	200 10	8240	8240
Bromodichloromethane	5.0	100 5.0	8240	8240
Benzene	5.0	100 5.0	8240	8240
Chloroethane	10	200 10	8240	8240
Chloromethane	10	200 10	8240	8240
Carbon disulfide	5.0	100 5.0	8240	8240
3-Chloropropene	5.0-10	100 10	8240	8240
Chloroform	5.0	100 5.0	8240	8240
Carbon tetrachloride	5.0	100 5.0	8240	8240
Chlorobenzene	5.0	100 5.0	8240	8240
2-Chloro-1,3-butadiene(chloroprene)	25	500 25	8240	8240
1,4-Dioxane (D) *	10000-10	10000 330	8240 8270	8240 8270 - 80 ₁₅ = 150 ppm
Dichlorodifluoromethane	20-50	400 50	8240	8240
1,1-Dichloroethene	5.0	100 5.0	8240	8240
1,1-Dichloroethane	5.0	100 5.0	8240	8240
trans-1,2-Dichloroethene	5.0	100 5.0	8240	8240
1,2-Dichloroethane	5.0	100 5.0	8240	8240
Dibromomethane	5.0	100 5.0	8240	8240
Dibromochloromethane	5.0	100 5.0	8240	8240
1,2-Dichloropropane	5.0	100 5.0	8240	8240
cis-1,3-Dichloropropene	5.0	100 5.0	8240	8240
trans-1,3-Dichloropropene	5.0	100 5.0	8240	8240
1,2-Dibromoethane	5.0	100 5.0	8240	8240
trans-1,4-Dichloro-2-butene	10	200 10	8240	8240
1,2-Dibromo-3-chloropropane	20-10	400 10	8240	8240
Ethyl methacrylate	10-50	200 50	8240	8240
Ethyl benzene	5.0	100 5.0	8240	8240
2-Hexanone	50	1000 50	8240	8240

V

* Method 8270

TABLE 9-1. Appendix IX Volatile Organic Compounds (Continued)

	Practical Quantitation Limits ^A		Prep Method	Analytical Method
	Groundwater ug/L	Low Soil/Sediment ^B ug/kg		
Iodomethane	5.0	100 5.0	8240	8240
Isobutanol (D)	10000 1000	10000 1000	8240	8240
Methylene chloride	10 5.0	200 5.0	8240	8240
Methyl ethyl ketone	100	2000 100	8240	8240
Methyl methacrylate	10 5.0	200 10	8240	8240
4-Methyl-2-pentanone(MIBK)	50	1000 50	8240	8240
Methacrylonitrile (D)	10000 1000	10000 1000	8240	8240
Propanenitrile	100	2000 100	8240	8240
Styrene	5.0	100 5.0	8240	8240
Trichlorofluoromethane	10 5.0	200 50	8240	8240
1,1,1-Trichloroethane	5.0	100 5.0	8240	8240
Trichloroethene	5.0	100 5.0	8240	8240
1,1,2-Trichloroethane	5.0	100 5.0	8240	8240
Tribromomethane(Bromoform)	5.0	100 5.0	8240	8240
1,1,1,2-Tetrachloroethane	5.0	100 5.0	8240	8240
1,2,3-Trichloropropane	5.0	100 5.0	8240	8240
Tetrachloroethene	5.0	100 5.0	8240	8240
1,1,2,2-Tetrachloroethane	5.0	100 5.0	8240	8240
Toluene	5.0	100 5.0	8240	8240
Vinyl chloride	10	200 10	8240	8240
Vinyl acetate	5.0 10	100 10	8240	8240
Xylenes (Total)	5.0	100 5.0	8240	8240

A Sample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achievable.

B PQLs listed for soil/sediment are based on wet weight. If data are reported on a dry weight basis, PQLs will be higher, based on the % moisture in each sample.

C USEPA SW-846 3rd edition.

D These compounds will be analyzed by Method 8240, direct injection technique.

TABLE 9-2. Appendix IX Semivolatile Organic Compounds

	Practical Quantitation Limits ^A		Prep Method ^C Water	Prep Method ^C Soil	Analytical ^C Method
	Groundwater ug/L	Low Soil/Sediment ^B ug/kg			
Acetophenone	10	330	350/ 3520	3550/3540	8270
Aniline	50	1700	3520	3550/3540	8270
Acenaphthylene	10	330	3520	3550/3540	8270
Acenaphthene	10	330	3520	3550/3540	8270
4-Aminobiphenyl	50 20	1700 660	3520	3550/3540	8270
2-Acetylaminofluorene	50 20	1700 660	3520	3550/3540	8270
Aramite	100	3000	3520	3550/3540	8270
Anthracene	10	330	3520	3550/3540	8270
Benzyl alcohol	10	330	3520	3550/3540	8270
4-Bromophenyl phenyl ether	10	330	3520	3550/3540	8270
Butylbenzylphthalate	10	330	3520	3550/3540	8270
Benzo(b)fluoranthene	10	330	3520	3550/3540	8270
Benzo(k)fluoranthene	10	330	3520	3550/3540	8270
Benzo(a)pyrene	10	330	3520	3550/3540	8270
Benzo(g,h,i)perylene	10	1000	3520	3550/3540	8270
Benzo(a)anthracene	10	330	3520	3550/3540	8270
bis(2-Chloroethyl)ether	10	330	3520	3550/3540	8270
bis(2-Chloroisopropyl)ether	10	330	3520	3550/3540	8270
2-Chlorophenol	10	330	3520	3550/3540	8270
bis(2-Chloroethoxy)methane	10	330	3520	3550/3540	8270
p-Chloroaniline	10	330	3520	3550/3540	8270
4-Chloro-3-methylphenol	10	330	3520	3550/3540	8270
4-Chlorophenyl phenyl ether	10	330	3520	3550/3540	8270
2-Chloronaphthalene	10	330	3520	3550/3540	8270
Chlorobenzilate	10-0.50	330-80	3520	3550/3540	8270 8080
Chrysene	10	330	3520	3550/3540	8270
1,3-Dichlorobenzene	10	330	3520	3550/3540	8270
1,4-Dichlorobenzene	10	330	3520	3550/3540	8270
1,2-Dichlorobenzene	10	330	3520	3550/3540	8270
2,4-Dimethylphenol	10	330	3520	3550/3540	8270
2,4-Dichlorophenol	10	330	3520	3550/3540	8270
Dimethylphenethylamine	10-50	330-1700	3520	3550/3540	8270
2,6-Dichlorophenol	10	330	3520	3550/3540	8270
Dimethylphthalate	10	330	3520	3550/3540	8270

TABLE 9-2. Appendix IX Semivolatile Organic Compounds (Continued)

	Practical Quantitation Limits ^A		Prep Method ^C Water	Prep Method ^C Soil	Analytical ^C Method
	Groundwater ug/L	Low Soil/Sediment ^B ug/kg			
1,3-Dinitrobenzene	10	330	3520	3550/3540	8270
2,6-Dinitrotoluene	10	330	3520	3550/3540	8270
Dibenzofuran	10	330	3520	3550/3540	8270
2,4-Dinitrotoluene	10	330	3520	3550/3540	8270
2,4-Dinitrophenol	50	1700	3520	3550/3540	8270
Diethylphthalate	10	330	3520	3550/3540	8270
4,6-Dinitro-2-methylphenol	50	1700	3520	3550/3540	8270
* Diphenylamine, (N-Nitrosodiphenylamine)	10	330	3520	3550/3540	8270
Dibutylphthalate	10	330	3520	3550/3540	8270
p-Dimethylaminoazobenzene	30	10	3520	3550/3540	8270
3,3'-Dimethylbenzidine	80	10	3520	3550/3540	8270
3,3'-Dichlorobenzidine	20		3520	3550/3540	8270
7,12-Dimethylbenz(a)anthracene	50	10	3520	3550/3540	8270
Di-n-octylphthalate	10		3520	3550/3540	8270
Dibenzo(a,h)anthracene	10		3520	3550/3540	8270
Dialkyl	10		3520	3550/3540	8270
Ethyl methanesulfonate	10	20	3520	3550/3540	8270
bis(2-Ethylhexyl)phthalate	10		3520	3550/3540	8270
Fluorene	10		3520	3550/3540	8270
Fluoranthene	10		3520	3550/3540	8270
Hexachloroethane	10		3520	3550/3540	8270
Hexachloropropene	50	10	3520	3550/3540	8270
Hexachlorobutadiene	10		3520	3550/3540	8270
Hexachlorocyclopentadiene	10		3520	3550/3540	8270
Hexachlorobenzene	10		3520	3550/3540	8270
** Hexachlorophene	50	NR	3520	3550/3540	8270
Indeno(1,2,3-cd)pyrene	10		3520	3550/3540	8270
Isophorone	10		3520	3550/3540	8270
Isosafrole	10		3520	3550/3540	8270
Methyl methanesulfonate	50	10	3520	3550/3540	8270
2-Methylphenol (o-cresol)	10		3520	3550/3540	8270
3-Methylphenol (m-cresol)	10		3520	3550/3540	8270
4-Methylphenol (p-cresol)	10		3520	3550/3540	8270
2-Methylnaphthalene	10		3520	3550/3540	8270

* N-Nitrosodiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine.

** No recovery

TABLE 9-2. Appendix IX Semivolatile Organic Compounds (Continued)

	Practical Quantitation Limits ^A		Prep Method Water	Soil	Analytical ^C Method
	Groundwater ug/L	Low Soil/Sediment ^B ug/kg			
Methapyriline	40-100	1300-3300	3510	3520	3550/3540
3-Methylcholanthrene	30-10	1000-330	3520	3550/3540	8270
N-Nitrosodimethylamine	10	330	3520	3550/3540	8270
N-Nitrosomethylalkylamine	10	330	3520	3550/3540	8270
N-Nitrosodiethylamine	10-20	330-660	3520	3550/3540	8270
N-Nitrosodipropylamine	10	330	3520	3550/3540	8270
Nitrobenzene	10	330	3520	3550/3540	8270
N-Nitrosopyrrolidine	10-40	330-1300	3520	3550/3540	8270
N-Nitrosomorpholine	10	330	3520	3550/3540	8270
N-Nitrosopiperidine	10-20	330-660	3520	3550/3540	8270
2-Nitrophenol	10	330	3520	3550/3540	8270
Naphthalene	10	330	3520	3550/3540	8270
N-Nitroso-di-n-butylamine	20-10	660-330	3520	3550/3540	8270
1,4-Napthoquinone	10	330	3520	3550/3540	8270
2-Nitroaniline	50	1700	3520	3550/3540	8270
3-Nitroaniline	50	1700	3520	3550/3540	8270
1-Naphthylamine	20-10	660-330	3520	3550/3540	8270
4-Nitrophenol	50	1700	3520	3550/3540	8270
2-Naphthylamine	20-10	660-330	3520	3550/3540	8270
5-Nitro-o-toluidine	20-10	660-330	3520	3550/3540	8270
4-Nitroaniline	50	1700	3520	3550/3540	8270
*N-Nitrosodiphenylamine (Diphenylamine)	10	330	3520	3550/3540	8270
4-Nitroquinoline-N-oxide	100	3000	3520	3550/3540	8270
Pyridine	ok	20-20 ^{fw}	660-330 (660)	3520	3550/3540
2-Picoline	70-10	2300-330	3520	3550/3540	8270
Phenol	10	330	3520	3550/3540	8270
Pentachloroethane <u>8240</u>	20-20	330-20	3520	3550/3540	8270-8240
Pentachlorobenzene	20-10	660	3520	3550/3540	8270
Phenacetin	10-20	330 (660)	3520	3550/3540	8270
Pentachlorophenol	50	1700	3520	3550/3540	8270
Pentachloronitrobenzene	20	660	3520	3550/3540	8270
Pronamide	30-10	1000-330	3520	3550/3540	8270
Phenanthrene	10	330	3520	3550/3540	8270

* N-Nitrosodiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine

TABLE 9-2. Appendix IX Semivolatile Organic Compounds (Continued)

	<u>Practical Quantitation Limits^A</u>		Prep Method ^C Water	Analytical ^C Method
	Groundwater ug/L	Low Soil/Sediment ^B ug/kg		
Pyrene	10	330	3520	3550/3540
p-Phenylenediamine	50	1700	3520	3550/3540
Safrole	10	330	3520	3550/3540
o-Toluidine	10	330	3520	3550/3540
1,2,4-Trichlorobenzene	10	330	3520	3550/3540
2,4,6-Trichlorophenol	10	330	3520	3550/3540
2,4,5-Trichlorophenol	50	1700	3520	3550/3540
1,2,4,5-Tetrachlorobenzene	10	330	3520	3550/3540
2,3,4,6-Tetrachlorophenol	20-10	660 330	3520	3550/3540
Tinuvin 327	50	5000	3520	3550/3540
Irgasan DP-300	50	5000	3520	3550/3540
Propazine	50	5000	3520	3550/3540
Butazolidin	50	5000	3520	3550/3540
Tofranil	50	5000	3520	3550/3540
DCDD	N/A	N/A	3520	3550/3540
Tr CDD	N/A	N/A	3520	3550/3540
DCDF	N/A	N/A	3520	3550/3540
TrCDF	N/A	N/A	3520	3550/3540
* sym-Trinitrobenzene (^D)	N/A	50	3520	3550/3540
			1700	8270

^A Sample PQLs are highly matrix dependent. The PQLs listed herein are provided for guidance and may not always be achievable.

^B PQLs listed for soil/sediment are based on wet weight. If data are reported on a dry weight basis,

PQLs will be higher, based on the % moisture in each sample.

^C US EPA SW-846 3rd Edition

^D Sym-Trinitrobenzene will be analyzed as a tentatively identified compound due to unavailability of standards.

* We have a standard from Supelco.

*** - We ^{do not} have method detection limit studies for these compounds ∴ we can not indicate any PQLs.

TABLE 9-3. Appendix IX Organochlorine Pesticides and PCBs

	<u>Practical Quantitation Limits^A</u>		<u>Prep Method^C</u>	<u>Analytical^C</u> Method
	<u>Groundwater</u> <u>ug/L</u>	<u>Low Soil/Sediment^B</u> <u>ug/kg</u>		
Aldrin	0.05	8	3510/3520	8080
alpha-BHC	0.05	8	3520	8080
beta-BHC	0.05	8	3520	8080
delta-BHC	0.05	8	3500 ³⁵²⁰	8080
gamma-BHC	0.05	8	3500	8080
alpha-Chlordane	0.1	16	3500	8080
gamma-Chlordane	0.1	16	3500	8080
4,4'-DDD	0.1	16	3500	8080
4,4'-DDE	0.1	16	3500	8080
4,4'-DDT	0.1	16	3500	8080
Dieldrin	0.1	16	3500	8080
Endosulfan I	0.05	8	3500	8080
Endosulfan II	0.1	16	3500	8080
Endosulfan Sulfate	0.1	16	3500	8080
Endrin	0.1	16	3500	8080
Endrin Aldehyde	0.1	16	3500	8080
Heptachlor	0.05	8	3500	8080
Heptachlor epoxide	0.05	8	3500	8080
Isodrin	10	1600	3500	8080
Kepone	10	1600	3500	8080
Methoxychlor	0.5	80	3500	8080
PCB-1016	0.5	80	3500	8080
PCB-1221	0.5	80	3500	8080
PCB-1232	0.5	80	3500	8080
PCB-1242	0.5	80	3500	8080
PCB-1248	0.5	80	3500	8080
PCB-1254	1.0	160	3500	8080
PCB-1260	1.0	160	3500	8080
Toxaphene	1.0	160	3500	8080

^A Sample PQMs are highly matrix dependent. The PQMs listed herein are provided for guidance and may not always be achievable.

^B PQMs listed for soil/sediment are based on wet weight. If data are reported on a dry weight basis,

^C PQMs will be higher, based on the % moisture in each sample.

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	<u>ug/L</u>	<u>ug/kg</u>	<u>Prep Method</u> <u>Water</u> <u>Soil</u>	<u>Analytical</u>
Chlorobenzilate	0.50	80	3510/3520 3550	8080

TABLE 9-4. Appendix IX Chlorinated Herbicides

	<u>Practical Quantitation Limits^A</u>			
	Groundwater ug/L	Low Soil/Sediment ^B ug/kg	Prep ^C Method	Analytical ^C Method
2,4-D	10-0.50	670-100	8150	8150
2,4,5-TP (Silvex)	2-0.10	270-20	8150	8150
2,4,5-T	2-0.30	270-60	8150	8150
Dinoseb	1-0.50	D	8150	8150

A Sample PQLs are highly matrix dependent. The PQLs listed herein are provided for guidance and may not always be achievable.

B PQLs listed for soil/sediment are based on wet weight. If data are reported on a dry weight basis, PQLs will be higher, based on the % moisture in each sample.

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D Dinoseb is not recovered from soil.

TABLE 9-5. Appendix IX Organophosphorous Pesticides

	Practical Quantitation Limits ^A		Prep Method ^C		Analytical ^C Method
	Groundwater ug/L	Low Soil/Sediment ^B ug/kg	Water	Soil	
Sulfotep	0.5	200	3520	3550/3540	8140 8141
Phorate	2	200	3520	3550/3540	8140 8141
Dimethoate	0.5	200	3520	3550/3540	8140 8141
Disulfoton	2	200	3520	3550/3540	8140 8141
Methyl parathion	0.5	200	3520	3550/3540	8140 8141
Ethyl parathion	0.5	200	3520	3550/3540	8140 8141
Famphur	1.0	1000	3520	3550/3540	8140 8140
Thionazin	1.0	1000	3520	3550/3540	8140 8141
o,o,o-Triethylphosphorothioate	1.0	1000	3520	3550/3540	8140 8141

^A Sample PQMs are highly matrix dependent. The PQMs listed herein are provided for guidance and may not always be achievable.

^B PQMs listed for soil/sediment are based on wet weight. If data are reported on a dry weight basis, PQMs will be higher, based on the % moisture in each sample.

^C US EPA SW-846 3rd Edition

* SL utilizes Method 8141 (capillary column) and our MDLs indicate that Radian's PQMs are achievable.



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TABLE 9-6 APPENDIX IX PCDDs AND PCDFs

<u>Compound</u>	<u>Reference</u>	<u>Practical Quantitation Limits(a)</u>	
		Groundwater ug/L	Soil ng/t ug/kg
2,3,7,8-TCDD	8280(b)	0.005	2.0 0.50
PCDDs	8280(b)	0.010.0050	5.0 0.50
PCDFs	8280(b)	0.010.0050	5.0 0.50

- (a) Sample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achievable.
- (b) USEPA SW-846 3rd Edition.

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CORPORATION

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TABLE 9-7 APPENDIX IX CLASSICAL PARAMETERS

<u>Compound</u>	<u>Method(a)</u>	<u>Practical Quantitation Limits(b)</u>	
		<u>Water</u>	<u>Soil</u>
Cyanide	9012	0.01 mg/liter	0.5 mg/kg 1.0
Sulfide	9030	1.0 mg/liter	2 mg/kg 25

(a) USEPA SW-846 3rd Edition.

(b) Sample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achievable.

TABLE 9-8 APPENDIX IX METALS (DISSOLVED)

<u>Metal</u>	<u>Prep Method(a)</u>	<u>Analytical Method(b)</u>	<u>Practical Quantitation Limits Groundwater(c) (ug/L)</u>
Antimony	3020	7041 (6010)	725
Arsenic	3020	7060	4
Barium	3005	6010	10
Beryllium	3005	6010	2
Cadmium	3005	6010	5
Chromium	3005	6010	10
Cobalt	3005	6010	20
Copper	3005	6010	20
Lead	3020	7421	3
Mercury	7470	7470	0.2
Nickel	3005	6010	20
Selenium	3020	7740	5
Silver	3005	6010	10
Thallium	3020	7871	5
Tin	3005	6010	100-50
Vanadium	3005	6010	20-10
Zinc	3005	6010	20

(a) USEPA SW-846 3rd Edition.

(b) USEPA SW-846 3rd Edition. Where listed, Method 6010 is the primary method. The alternative SW-846 method(s) will be used only as necessary.

(c) Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwater than can be reliably determined by the indicated methods under routine laboratory conditions. The PQLs are highly matrix-dependent and may not always be achievable.



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TABLE 9-9 APPENDIX IX METALS (TOTAL)

	Analytical Methods(b)			Practical Quantitation Limits	
	Primary Method	Prep Method(a) Water	Soil	Groundwater ug/liter	Soil(d) mg/kg
Antimony	7041 (4010)	3020	3050	725	2.5
Arsenic	7060	3020	3050	4	0.4
Barium	6010	3005	3050	10	1.0
Beryllium	6010	3005	3050	2	0.2
Cadmium	6010	3005	3050	5	0.5
Chromium	6010	3005	3050	10	1
Cobalt	6010	3005	3050	20	2
Copper	6010	3005	3050	20	2
Lead	7421	3020	3050	3	0.3
Mercury	7470 (Water) 7471 (Soil)	7470	7471	0.2	0.2
Nickel	6010	3005	3050	20	2
Selenium	7740	3020	3050	5	0.5
Silver	6010	3005	3050	10	1.0
Thallium	7841	3020	3050	5	0.5
Tin	6010	3005	3050	100-50	10-5.0
Vanadium	6010	3005	3050	20-10	2-1.0
Zinc	6010	3005	3050	20	2

- (a) USEPA SW-846 3rd Edition.
- (b) USEPA SW-846 3rd Edition. Where listed, Method 6010 is the primary method. The alternate SW-846 method(s) will be used only as necessary.
- (c) Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwater that can be reliably determined by the indicated methods under routine laboratory conditions. The PQLs are highly-matrix dependent and may not always be achievable.
- (d) PQL in soil using 1 g or soil and a final extract volume of 100 ml.



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TABLE 9-10 GENERAL CHEMISTRY PARAMETERS

<u>Parameter</u>	<u>Expected Method</u>	<u>Detection Limit</u>	<u>Method No.</u>	<u>Reference</u>
Alkalinity		1,000 ug/L (Water)	310.1	1
pH		0.05 pH unit (Water)	150.1	1
		0.05 pH unit (Solids)	3.2.2	2
Dissolved Solids (Total)	5000	1,000 ug/L (Water)	160.1	1
Suspended Solids (Total)	5000	1,000 ug/L (Water)	160.2	1
COD	2000	5,000 ug/L	410.1	1
BOD		1,000 ug/L	405.1	1
Organic Carbon (Total)		1,000 ug/L (Water)	415.1 (9060)	1,3
Carbonate		a	310.1	4
Chloride		1,000 ug/L (Water)	325.3	1
Ammonia, as N		30 ug/L (Water)	350.1	1
Calcium		500 ug/L	6010	3
Iron		50 ug/L (Water)	6010	3
Magnesium		500 ug/L (Water)	6010	3
Manganese		10 ug/L (Water)	6010	3
Nitrate/Nitrite		50 ug/L (Water)	353.1 353.2	1
Phosphorus, as PO ₄		100 ug/L (Water)	365.2 365.4	1
Potassium		1,000 ug/L (Water)	6010	3
Silica		500 ug/L	4250-6010	5
Sodium		1,000 ug/L (Water)	6010	3
Sulfate		5000 ug/L (Water)	375.4 375.2	1
Oil and Grease		1,000 ug/L (Water)	413.2	1
Organic halogens (Total)		100 ug/L (Water)	9020	3
Hardness, as CaCO ₃		a	314A	4
Langlier's Index		a	203	4
Hydrogen Sulfide (Total Sulfide)		100 ug/L	376.1 (9030)	3,1
Total Kjeldahl Nitrogen		100 ug/L	351.2	1
Cation Exchange Capacity		1 meq/100 g (Solid)	9080	3

(a) Method Detection Limit not applicable

References:

- (1) U. S. Environmental Protection Agency (EPA), March 1983, "Methods for Chemical Analysis of Water and Wastes", Publication EPA-600/4-79-020.
- (2) U. S. Environmental Protection Agency (EPA), March 1978, "Field and Laboratory Methods Applicable to Overburdens and Mine Soils", EPA-600/2-78-054.
- (3) U. S. Environmental Protection Agency (EPA), "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition.
- (4) Standard Methods for the Examination of Water and Wastewater, 16th ed., 1985.
- (5) Standard Methods for the Examination of Water and Wastewater, 6th ed., 1962.

Attachment #3

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EXCEPTION SHEET

APPENDIX IX - RCRA METHOD 8240

The following compounds are currently required by Appendix IX but are not now being analyzed by the laboratory. These compounds are under evaluation and validation by the laboratory and will be added to this product if it is determined that they are analytically feasible. The compounds preceded by an asterisk (*) are under consideration by the EPA to be removed from the required list of compounds to be analyzed under Appendix IX.

2-Chloro-1,3-Butadiene (1)	$\Rightarrow 8010$	50PQL	* Ethyl Cyanide (3)	?
Dichlorodifluoromethane (2)	$\Rightarrow 8010$	10PQL	* Isobutyl Alcohol (3)	8015 50PQL
* 1,4-Dioxane (3)	$\Rightarrow 8015$	50PQL	* Methacrylonitrile (3)	8015 5 PQL
* Acetonitrile (3)	$\Rightarrow 8015$	100PQL	* Methyl Methacrylate (3)	8015 2PQL
8240				

The following compounds are not analyzed by the laboratory due to specific analytical problems that are described below.

? * Ethylene oxide: not stable in water
 * Dichlorodifluoromethane: delisted by Federal Registry (#46FR2264) due to recovery problems

? Trichloromethanethiol: No standard available

- (1) No Standard available
 (2) Delisted by Federal Registry (#46FR2264) \rightarrow From PRIORITY POLLUTANTS ONLY
 (3) Not included in Standard 8240 Analysis, but can be analyzed by EPA SAS Method 1944HQ. (Direct Injection, GC/MS)

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EXCEPTION SHEET

Pesticides - Method 8080 (Appendix 8,9)

The following compound is currently required by Appendix IX and Appendix VIII but not being analyzed by the laboratory. This compound is under evaluation and validation and will be added to this product if it is determined that it is analytically feasible.

8150 - 1
8270 - 10

2-sec-butyl-4,6-dinitrophenol (Dinoseb)
Famphur

8270 - 10

1

M. S.

Demonstration of CAPABILITY

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EXCEPTION SHEET

APPENDIX IX - METHOD 8270

The following compounds are currently required by Appendix IX but are not now being analyzed by the laboratory. These compounds are under evaluation and validation by the laboratory and will be added to this product if it is determined that they are analytically feasible. The compounds preceded by an asterisk (*) are under consideration by the EPA to be removed from the required list of compounds to be analyzed under Appendix IX.

m-Dinitrobenzene

4-Nitroquinoline 1-Oxide

Hexachlorophene

The following compounds are not analyzed by the laboratory due to specific analytical problems that are described below.

- * 3-Chloropropionitrile (1)
- * 2-Chloro-1,3-butadiene (2)
- * Benzenethiol (1)
- * Dibenzo(a,e)pyrene (2)
- * Dibenzo(a,h)pyrene (2)
- * Dibenzo(a,i)pyrene (2)

- * Malononitrile (1)
- * Resorcinol (1)
- * Tris (2,3-dibromopropyl)phosphate (1)
- * p-Benzoquinone (1)
- * N-Nitrosodiphenylamine (3)
- * Aramite

(1) Not recovered in a complex standard mix

(2) No standard available

(3) Not distinguishable from Diphenylamine

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EXCEPTION SHEET

Organophosphorus Pesticides - Method 8140 (Appendix 8,9)

The following compounds are currently required by Appendix VIII and Appendix IX but are not being analyzed by the laboratory. These compounds are under evaluation and validation and will be added to this product if it is determined that they are analytically feasible.

Famphur
0,0,0-triethyl phosphorothioate

#3 pg. 505

EXCEPTION SHEET

Herbicides - Method 8150 (Appendix 8,9)

The following compound is currently required by Appendix VIII and Appendix IX but not being analyzed by the laboratory. This compound is under evaluation and validation and will be added to this product if it is determined that it is analytically feasible.

2-Sec-Butyl-4,6-Dinitrophenol (Dinoseb)



June 19, 1991

Kevin Connell
Analytical Services Group
Sample Management Office

Alexandria, VA 22313

RE: SAS No. 6412-H Task II

Dear Mr. Connell:

Pursuant to our conversation on June 18, 1991, I am writing to request a written variance from the contract related to the above referenced SAS number (method SOW 12/90 Draft).

On June 10, 1991, we submitted our bid request related to SAS 6412-H; on June 13, 1991, we were awarded the SAS project.

The Draft 12/90 Statement of Work on page D-20 states: "In addition, the chromatographic peak separation between the 123478-HxCDD and 123678-HxCDD in the CC3 solution shall be resolved with a valley of <50 percent."

This is the first time we are aware of this criteria being included in a low or high resolution methodology. In our attempts to get ready for this SAS to begin, we analyzed several CC3 standards and found that the DB-5 column does not resolve these two hexa isomers with valley's below 50%. We felt it was important to point this out prior to the start of the SAS and to request a variance to this criteria. Based on both Low Resolution and High Resolution data (which will be discussed in the next paragraph) we would recommend eliminating the criteria altogether or raising it to 80% which better represents the resolution ability of commercially available DB-5 columns.

In addition, since the two HxCDD isomers cannot be resolved on a DB-5 column, we propose to confirm and quantitate any positives on a SP-2331 column where baseline resolution is possible.

2545 Boatman Avenue
West Sacramento, California 95691
916/371-9017 Fax: 916/372-7768

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#4

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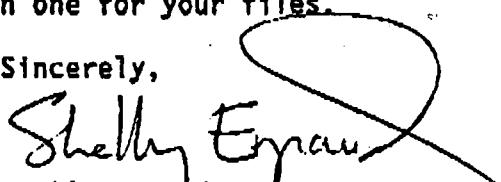

Kevin Connell
June 19, 1991
Page 2

As mentioned above, we are providing the following chromatograms to illustrate our point.

1. Sixteen continuing calibration points on 2 different instruments equipped with a DB-5 column and the mean resolution achieved (72% on one DB-5 column and 78% on the other).
2. Three continuing calibration points from a high resolution instrument equipped with a DB-5 column (71% valley).
3. Chromatogram from a daily standard on a Old column (0% resolution).
4. Twelve continuing calibration points on 2 different instruments equipped with SP-2331 columns. The mean resolution achieved (17% on one SP-2331 column and 14% on the other).

In order for us to meet our contract delivery time, we will need to begin analyzing our samples with the above referenced variance from the Draft 12/90 SOW by no later than July 1, 1991. Please indicate your acceptance of our proposed variance no later than July 1, 1991, by signing and dating the acknowledgement below. Please return a signed and dated copy to me and retain one for your files.

Sincerely,



Shelly Eyrard
Manager of Low Resolution Dioxin Services

Variance agreed to and accepted by Sample Management Office of the Environmental Protection Agency:

By:

Title:

Dated: June _____, 1991

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** TOTAL PAGE.003 **